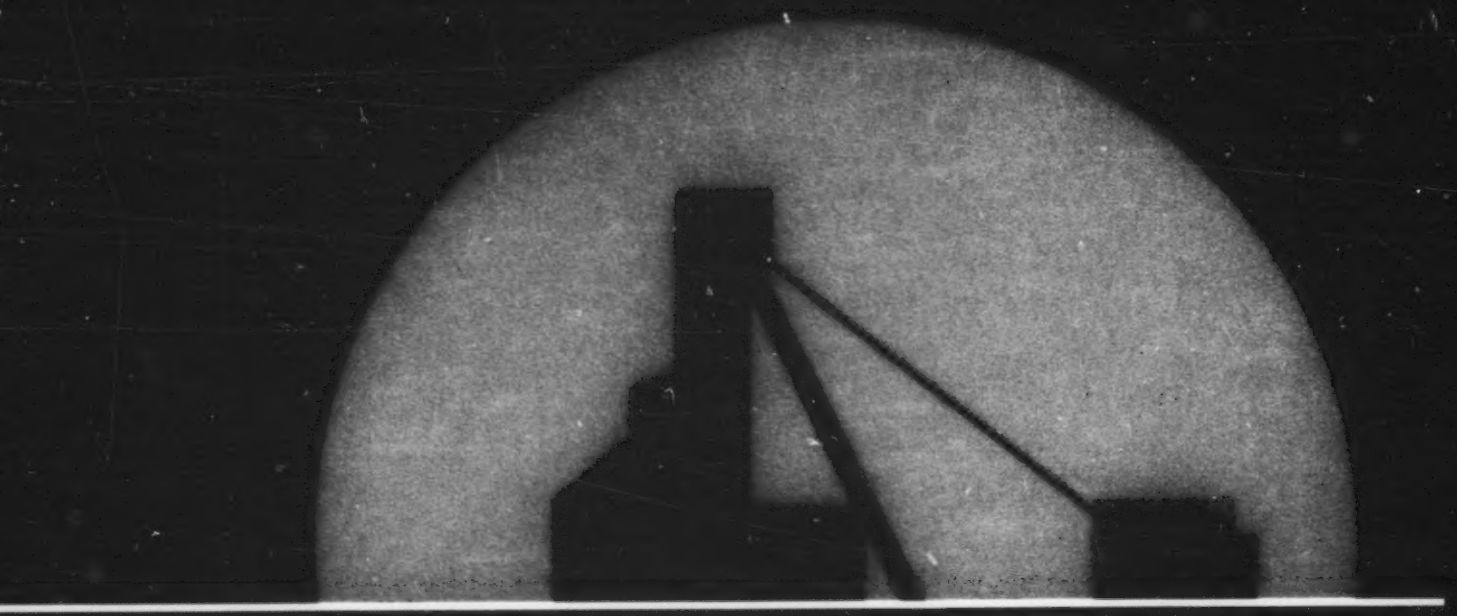
Mines and Mineral Activities 1989



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Mines and Mineral Activities 1989

Northern Affairs Program

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INTRODUCTION

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This report covers the activities of the mines and minerals sector in the Yukon Territory and Northwest Territories during the calendar year 1989.

The report was compiled and written by D.D. Brown and T.W. Caine of Mining and Infrastructure Directorate of the Department of Indian Affairs and Northern Development, Ottawa. Sections on mineral exploration are based on 1989 mining activity overviews produced by DIAND regional geological staff under the direction of S.R. Morison in Yukon and W.A. Padgham in the Northwest Territories. The review of the Yukon placer mining industry is based on a 1989 review produced by the Mining Inspection Division and the Geology Section of DIAND in Yukon. The section on metal prices was written by D. Law-West of the Mineral Economics and Project Analysis Division, DIAND, Ottawa.

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SUMMARY

Yukon Territory

The value of mineral commodities produced in Yukon in 1989 was estimated at $540.3 million compared with $492.3 million in 1988. Most of the production value was derived from two hard-rock mines and 220 seasonal placer gold operations. The largest operation, Curragh Resources' Faro zinc-lead-silver mine, was the leading producer followed by the 220 Yukon placer mining operations and Canamax Resource's Ketza River gold mine. The most significant development projects were the early stage development of Curragh Resources' Grum and Vangorda zinc-lead-silver deposits in the Vangorda Plateau area and Curragh Resources' development of the Mt. Hundere zinc-lead-silver property in joint venture with Hillsborough Resources. Mineral exploration expenditures dropped sharply in 1989 to $18 million from $50 million a year previously. Exploration activities were directed to the search for both precious and base metals.

Northwest Territories

The value of mineral commodities produced in the Northwest Territories in 1989 was estimated at $965.6 million compared with $826.5 million a year earlier. The minerals were produced principally at six hard-rock mines, composed of four gold mines and two zinc-lead mines. The four gold mines are located in Slave Structural Province which extends north from Yellowknife to Coronation Gulf. The two zinc-lead mines are located in the Arctic Islands Region and the northeastern Northwest Territories, well north of the Arctic Circle. Together, zinc and lead production accounted for 80 per cent of the total value of mineral production shipments, while gold production amounted to 18 per cent.

Highlights included rapid progress in the construction of Northgate Exploration's new 9 000 tpd mill on its Colomac gold mine property and the commissioning of Treminco Resource's new 180 tpd mill at its Ptarmigan gold mine. Underground development projects were conducted in the Tundra, MON and Burnt Island gold properties.

Mineral Exploration expenditures dropped sharply to an estimated $55.6 million in 1989 from $112.6 million a year previously. Accordingly, there was a reduction in the number of properties explored in 1989 to 121 compared with 157 a year previously. Gold continued to be the leading target commodity accounting for 99 exploration projects, while silver and base metals accounted for 22 projects.

Among the more promising exploration projects were the drilling of the Nicholas Lake, Viking, Goodwin Lake (Kam claims) and Mon gold properties in the Yellowknife volcanic belt. In 1990, Treminco Resources Ltd. plans to mine the Crestaurium gold property.

SOMMAIRE

Yukon

On a estimé la valeur de la production minérale au Yukon en 1989 à 539,9 millions de dollars, comparativement à 492,2 millions en 1988. La majeure partie de celle-ci provenait de deux mines en roche dure et de 220 exploitations saisonnières de placers aurifères. La mine la plus importante, la mine de zinc, plomb et argent de la Curragh Resources à Faro, a connu la production la plus élevée, suivie par les 220 exploitations de placers du Yukon et la mine d'or de la Canamax Resources sur la rivière Ketza. Les projets de développement les plus importants ont été les travaux préliminaires réalisés aux gisements de zinc, plomb et argent Grum et Vangorda de la Curragh Resources, dans la région du plateau Vangorda, et sur la propriété de la société renfermant ces mêmes minéraux, située au mont Hundere, qui a été mise en valeur dans le cadre d'une entreprise en participation avec la Hillsborough Resources. Les dépenses d'exploration minière ont baissé de façon marquée en 1989 pour atteindre 18 millions de dollars, comparativement aux 50 millions que l'on avait connu l'annè précédente. Les activités d'exploration ont porté sur la recherche aussi bien de métaux précieux que de métaux communs.

Territoires du Nord-Ouest

On a estimé la valeur de la production minérale dans les Territoires du Nord-Ouest en 1989 à 956,6 millions de dollars, comparativement à 826,5 millions l'année précédente. Les minéraux produits provenaient principalement de six mines en roche dure, soit quatre mines d'or et deux mines de zinc et plomb. Les quatre mines d'or sont situées dans la structure du lac des Esclaves, qui va du nord de Yellowknife au golfe du Couronnement. Les deux mines de plomb et zinc se trouvent dans la région de l'archipel Arctique et dans le nord-est des Territoires du Nord-Ouest, bien au nord du cercle polaire arctique. Dans son ensemble, la production de zinc et de plomb correspondait à 80 p. 100 de la valeur totale des expéditions de minéraux alors que l'or extrait équivalait à 18 p. 100 de la production.

Parmi les faits saillants, citons notamment les progrès rapides réalisés dans les travaux de construction de la nouvelle usine de traitement d'une capacité de 9 000 tonnes par jour de la Northgate Exploration, sur sa propriété aurifère Colomac, et la décision de la Treminco Resources concernant la construction d'une usine de traitement d'une capacité de 180 tonnes par jour à sa mine d'or Ptarmigan. Des projets de développement souterrain sont aussi été mis en oeuvre sur les propriétés aurifères Tundra et MON, et sur celle de l'île Burnt.

Les dépenses de la prospection des minerais ont baissé de façon marquée en 1989 pour atteindre un montant estimatif de 55,6 millions de dollars, comparativement à 112,6 millions l'année précédente. On a par conséquent constaté au cours de l'année une réduction du nombre de propriétés explorées, qui a atteint 121, comparativement à 157 l'année précédente. L'or a continué de constituer le minéral le plus convoité, faisant l'objet de 99 projets d'exploration, alors que l'argent et les métaux communs étaient visés par 22 projets.

Parmi les projets d'exploration les plus prometteurs, signalons les forages effectués sur les propriétés Viking et MON et sur celles des lacs Nicholas et Goodwin (concessions Kam), dans la zone volcanique de Yellowknife. En 1990, la Treminco Resources Ltd. prévoit exploiter sa propriété aurifère Crestaurium.

MINES AND MINERAL ACTIVITIES

Yukon Territory

Mineral Production

The value of mineral production in Yukon during 1989 was estimated at $540.3 million compared with $492.2 million in the previous year. The leading producer, Curragh Resources Inc.'s Faro zinc-lead-silver mine operated at near capacity for most of the year to produce 487 000 t of concentrate. Strong zinc and lead prices have encouraged the company to proceed with the development of the nearby Vangorda Plateau zinc-lead-silver deposits, including the Vangorda, Grum and DY deposits. Canamax Resource's Kezta River gold mine operated at capacity during the year and placer gold production increased approximately nine per cent from the previous year, despite lower gold prices in 1989. Since 1987, placer mining has been second only in value of output to Curragh Resources' zinc-lead-silver production. Other small mine operators produced coal, jade and rhodonite. United Keno Hill Mines Ltd. produced a small quantity of silver and lead before it closed, in January 1989, as a result of low metal prices and high operating costs.

Significant mine development projects included Curragh Resources Inc.'s development work on the Vangorda and Grum deposits and the Curragh Resources-Hillsborough Resources joint venture development work on the Mt. Hundere zinc-lead-silver property.

Yukon's two hard-rock mines, Curragh Resources' Faro Mine and Canamax Resource's Ketza River Mine, employed 639 persons directly in 1989. In addition, Yukon's placer mining industry employed an estimated 700 to 800 persons on a seasonal basis.

Yukon accounted for 12.0 per cent of the zinc and 3.5 per cent of the gold produced in Canada during 1989. Yukon's metallic mineral production amounted to 3.7 per cent of the value of the Canadian total compared with 3.6 percent in 1988.

Mines

Canamax Resources Inc., Ketza River Mine

Average mill throughput at the Ketza River mine(c)* increased to 336 tpd for a total throughput of 119 789 t of ore in 1989. Production amounted to 1 216 kg of gold from ore grading 11.32 g of gold per t. Gold production from oxide ore in the Ketza River mine's underground workings was augmented by oxide ore from the nearby Break-Nu, Tarn and Ridge open-pits. Over 45 000 t of ore were delivered to the mill in 1989 from these surface deposits. Known oxide gold reserves are forecast to be depleted in the fourth quarter of 1990. Metallurgical studies of the unmined sulphide reserves indicate that an acceptable gold recovery can be achieved. It is expected that a decision to produce sulphide ore will be made during 1990.

Type:	underground and open-pit
Location:	60 km south of Ross River
Product:	gold
Mill Capacity:	400 tpd
Tonnes Milled:	119 789 t
Oxide Reserves:	124 941 t (December 31,1989)
Oxide Reserve Grade:	12.42 g/t gold
Sulphide Reserve:	180 000 t (December 31, 1989)
Sulphide Reserve Grade:	11.32 g/t gold
Employees:	110 (December 31,1989)

* Numbers or letters in parenthesis indicate the location of the property on the Yukon map.

Table 1:
Mineral Production of Operating Mines in Yukon, 1987, 1988 and 1989

Company, Mine and Commodity	1987 t	1987 kg	1988 t	1988 kg	1989(P) t	1989(P) kg
Canamax Resources Inc.						
Ketza River Mine						
gold		—		635		1 216
Curragh Resources Corp.						
Faro Mine						
zinc	184 727		200 927		176 832	
lead	121 539		149 354		108 144	
silver		109 202		214 051		95 428
Nadahini Mining Corporation						
Whiskey Lake						
coal	20 000		10 000		40 000	
Total Energold Corporation						
Mount Skukum Mine						
gold		1 379		169		—
silver		1 068		N/A		—
United Keno Hill Mines Ltd.						
Elsa area mines						
silver		46 437		54 181		902
lead	1 605		2 818		82	
zinc	385		300		N/A	

Source: Department of Indian Affairs and Northern Development. These figures are those reported by the mines as production and will not match Statistics Canada's production figures which are based on metals sold or shipped.

N/A = Not available — = Nil
(P) = Preliminary

Curragh Resources Inc.

In 1989, the Faro Mine (b) produced 4 391 062 t of ore and recovered 316 000 t of zinc concentrate and 171 000 t of lead concentrate for a total of 487 048 t of concentrate. This compares with 516 310 t in 1988. The output contained 176 832 t of zinc, 108 144 t of lead and 95 428 kg of silver. Production in 1989 was hampered by abnormal weather conditions during the year, as record cold temperatures were followed by rapid and unexpected thaws.

The company expects total capital expenditures to amount to $141.8 million through to 1992 to develop its ore deposits in the Vangorda Plateau area (b), southeast of the Faro mine. These deposits include the Grum, Vangorda and DY. The company's mine plan contemplates continued ore production from the Faro open-pit through 1991 which, with supplemented ore from a small underground operation in the Faro deposit adjacent to the pit, will provide all the ore feed to the concentrator through mid-1991. By the end of 1992, the existing Faro ore body will be exhausted. In order to maintain the company's existing concentrator through year 2000, the mine plan contemplates that the ore supply will be drawn from the nearby Grum and Vangorda open-pits and the DY underground mine.

In 1989, a portal for a decline to access underground reserves adjacent to the Faro open-pit was established in the pit wall. Pre-stripping of the Grum deposit continued to supply material for the construction of the 14-km long haul road connecting the new pits to the Faro concentrator. Also a mine dry, office complex and water treatment plant were built. In 1990, the first new production will come from the underground mine beneath the southeast corner of the Faro open-pit and from the Vangorda open-pit mine.

Type:	open-pit
Location:	13 km north of Faro
Product:	zinc, lead, silver
Mill Capacity:	135 00 tpd
Tonnes Milled:	4 391 062 t
Reserves:	at Faro and Vangorda Plateau Deposits (December 31, 1989)

	Tonnes (in thousands)	Zinc %	Lead %	Silver (g/t)	Gold (g/t)
Faro open-pit	12 011	4.68	2.75	31	.21
Faro stockpile	1 215	3.26	2.04	27	—
Faro underground	1 178	6.27	4.11	60	.31
Grum open-pit	25 161	5.01	2.96	50	.81
Vangorda open-pit	6 935	4.51	3.49	48	.65
DY underground	11 300	6.84	5.82	83	.94
	57 800	5.23	3.54	52	.66

Employees: 508 (December 31,1989)

United Keno Hill Mines Limited, Elsa Area Mines

The company only milled 2 177 t of ore at its Elsa mill (a) compared with 91 987 t a year earlier because operations were suspended on January 6, 1989. The Husky Southwest, Bellekeno, Silver King and the open-pits were in production during the first six days of the year. A total of 902 kg of silver and 81.6 t of lead were produced in 1989 although metals sold totalled 5 536.4 kg of silver and 371.9 t of lead. All mining operations were mothballed and the mill and town site facilities were placed on a care and maintenance basis pending improved silver prices.

Type:	underground and open-pit
Location:	Keno Hill-Galena Hill area, near Elsa
Product:	silver, lead
Mill Capacity:	450 tpd
Tonnes Milled:	2 177 t
Reserves:	292 100 t (December 31, 1989)
Reserve Grade:	871 g/t silver, 4.6% lead
Employees:	27 (January 31, 1989)

Seasonal Mine Operations

Anooraq Resources Corp., Evelyn Creek Rhodonite Mine

The company mined approximately 180 t of rhodonite from the Marlin property near Evelyn Creek (e). Some 36 t were shipped to the orient via Vancouver, B.C. Rhodonite is a manganese silicate mineral and is used as a decorative stone.

Nadahini Mining Corporation, Whiskey Lake Mine

The company operated the open-pit Whiskey Lake coal mine (d), located west of Ross River, under an agreement with Curragh Resources Inc. Coal production is trucked to Faro where it is used as fuel for the concentrate drier at the Faro mill. Nadahini mined approximately 40 000 t of bituminous coal in 1989. About one-half of the production was stockpiled for use in 1990. Because of the stockpile, the mine will not be operated during 1990.

Placer Mining

In 1989, Yukon's placer mining industry reported 5 149.8 kg of crude gold, which exceeded the total 1988 production of approximately 5 089.4 kg of crude gold. These production levels surpassed the record set in 1917. The 1989 production represented approximately 4 119.9 kg of fine gold valued at approximately $59.7 million.

There were approximately 220 active placer operations during the year directly employing an estimated 700 to 800 people during the five- to six-month operating season. The traditional placer mining areas continued to provide over 75 per cent of the gold output. These include the Klondike (2), Sixtymile (1) and Indian River (3) drainages. Placer operations in the Livingston Creek (23), Clear Creek, Burwash (14), Big Creek and Mayo area (9) produced the remaining 25 per cent. In the Dawson Mining District, Teck Mining Corporation produced 260.7 kg of fine gold at its operations on Gold Run Creek, a tributary of Dominion Creek.

Gold City Resources Ltd. continued to mine at three locations on the Indian River (3): at the mouth of Quartz Creek, at the mouth of Ruby Creek and at the mouth of McKinnon Creek. This 20-person operation produced over 167.9 kg of fine gold. The Indian River area, which was basically unmined prior to 1984, is now the leading gold producing area in Yukon. Over 2 489 kg of crude gold has been produced in this area in the period 1985-1989 inclusive.

Other major operators included Queenstake Resources Ltd., which produced 101.1 kg of fine gold from its operation on Maisy Mae Creek (7) and 20.5 kg of fine gold from its operation on Blackhills Creek (6). Canada Tungsten Mining Corporation Ltd. produced 153.4 kg of fine gold from its Swamp Creek (10) operation in the Moosehorne Range. Faith Mines Ltd., at Thistle Creek, 150 km southwest of Dawson City produced approximately 87 kg of raw gold.

In 1989, D-10 Caterpillar bulldozers increased production through their increased ripping capability in the preparation of frozen ground for mining.

Development

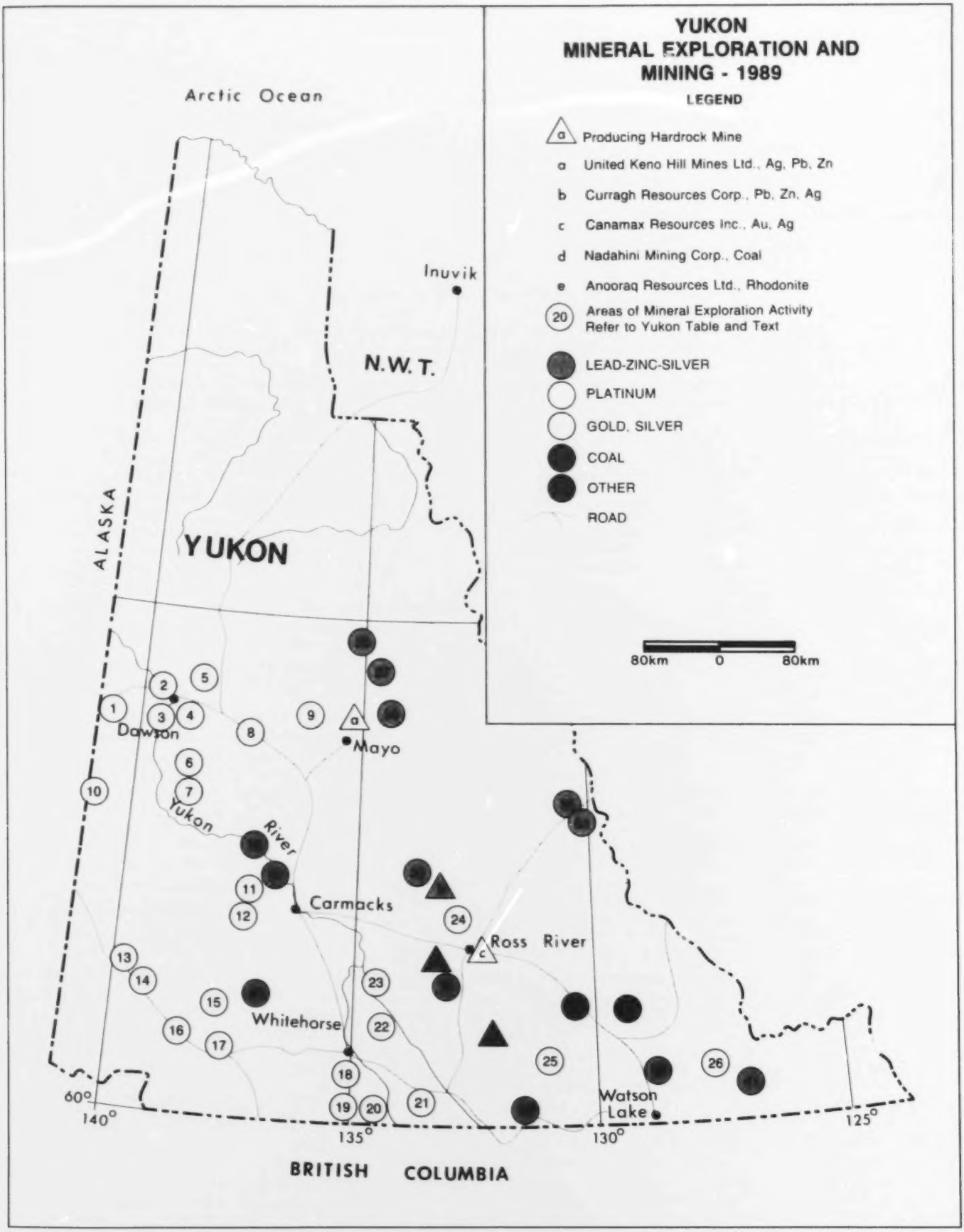
One of the most significant projects in 1989 was Curragh Resources Inc.'s development work on the VANGORDA, GRUM and DY (b) stratabound zinc-lead-silver deposits. The initial phase of the new mine developments in the Vangorda Plateau area, 15 km southeast of the Faro mine, consisted of pre-stripping the GRUM deposit. Also, a mine dry, office complex and water treatment plant were constructed. The first new open-pit production in 1990 will come from the 6 000 000 t VANGORDA deposit.

Curragh Resources in joint venture with Hillsborough Resources completed a major drilling project to define open-pit and underground reserves on the Mt. Hundere zinc-lead-silver property (27). The joint venture partners expect to bring the property into production during 1990. Capital costs of developing the property have been estimated at approximately $70 million.

Mineral Exploration

Yukon experienced a sharp drop in mineral exploration in 1989 with expenditures falling to $18 million from a record-high $50 million in 1988. The decline was due to low prices, for gold and silver, changes to the structure of the flow-through share tax program, high interest rates and the poor performance of equities markets.

Exploration activities were directed to precious and base metals. Strong base metal prices encouraged exploration for zinc, nickel, copper and lead. Work was done on at least 64 separate properties. Only 15 diamond drill projects were carried out compared with more than 30 the previous year.


YUKON
MINERAL EXPLORATION AND
MINING - 1989
LEGEND
a Producing Hardrock Mine
a United Keno Hill Mines Ltd., Ag, Pb, Zn
b Curragh Resources Corp., Pb, Zn, Ag
c Canamax Resources Inc., Au, Ag
d Nadahini Mining Corp., Coal
e Anooraq Resources Ltd., Rhodonite
20 Areas of Mineral Exploration Activity
Refer to Yukon Table and Text
LEAD-ZINC-SILVER
PLATINUM
GOLD, SILVER
COAL
OTHER
ROAD
80km 0 80km
Arctic Ocean
Inuvik
N.W.T.
ALASKA
YUKON
Dawson
Mayo
Yukon River
Carmacks
Ross River
Whitehorse
Watson Lake
60°
140°
135°
130°
125°
BRITISH COLUMBIA

Exploration Projects

Zinc-Lead-(Precious Metals) Exploration

Near Watson Lake, Curragh Resources Inc., in joint venture with Hillsborough Resources Ltd., purchased the HUNDERE (27) zinc-lead-silver skarn deposit from Canamax Resources Inc. and carried out 29 078 m of infill diamond drilling in 155 diamond holes. The drill program confirmed existing reserves of 5.2 million t grading 13.4 per cent zinc, 5.3 per cent lead and 60 g of silver per t. The reserves include 662 000 t of oxide reserves and 2 360 000 t in the Jewelbox-Hill area. The program confirmed the presence of multiple zones of mineralization in the Jewelbox-Hill area amenable to both open-pit and underground mining.

East of Watson Lake, Barytex Resources Corp. optioned Breakwater Resource's MEL zinc-lead-barite property (41). In 1989, the company conducted engineering studies and drilled 202 m.

First Yukon Silver Resources Inc. discovered high-grade zinc mineralization in two layers of calc-silicate skarn on its property near Swift River (28).

At Macmillan Pass, Cominco Ltd. continued its two-year drill program to test the down-plunge extension of high-grade zones on the west side of the 9 300 000 t TOM (34) zinc-lead-silver deposit. To the northwest of the TOM property, Cominco drilled two holes to check the strike extension of thick low-grade mineralization on the NIDD property (35).

In the Pelly Mountains, Yukon Minerals Corporation reported the discovery of stratiform lead-zinc-silver-copper mineralization over a 400-m strike length adjacent to its GROUNDHOG property (29).

Some 32 km northeast of Keno City, Archer, Cathro and Associates (1981) Ltd. completed five diamond drill holes on the MARG (36) volcanogenic massive sulphide deposit for NDU Resources Ltd. Zinc-lead-copper-silver-gold mineralization occurs in two sub-parallel zones over a strike length of 280 m. Geological reserves amount to 3 480 000 t grading 1.76 per cent copper, 2.68 per cent lead, 5.01 per cent zinc, 59.7 g of silver per t and 1.06 g of gold per t. The JANE occurrence, a similar target located 7.5 km to the southeast of the MARG deposit, was explored with soil and geophysical surveys.

On the BLENDE property (37), northeast of Mayo, Billiton Metals Canada Inc. optioned the claims from NDU Resources Inc. Epigenetic lead and zinc occur in brecciated Proterozoic dolomite. Archer, Cathro and Associates (1981) Ltd. carried out a program of detailed mapping and geochemistry in 1989 as a follow-up to a three-hole drill program that was conducted in 1988. Intermittent mineralization was traced on surface over a strike length of 6 km.

Copper Exploration

At Aishihik Lake, Casau Resources Ltd. and Aurora Gold Ltd. drilled on the HOPKINS gold skarn property (30), formerly owned by Whitehorse Copper Mines Ltd. Up to five skarn horizons were successfully traced and drilling on the south side of Franklin Creek intersected 7.8 m grading almost 2 per cent copper.

In the Dawson Range, two copper deposits hosted in foliated granodiorite were re-evaluated. At the WILLIAMS CREEK deposit (31), with an oxide reserve of 14.5 million t grading one per cent copper, Teck Corporation shipped a three t bulk sample for metallurgical leach testing and began baseline environmental studies. United Keno Hill Mines Ltd. carried out 4 897 m of rotary drilling to test geochemical targets near the MINTO (32) copper deposit. The deposit contains 6.55 million t at an average grade of 1.86 per cent copper. A new showing was discovered northeast of the MINTO deposit, with mineralization grading 0.93 per cent copper over a strike length of 39.6 m. A rotary drill hole on the showing intersected 4.5 m grading 0.22 per cent copper.

In the Faro area, Aurum Geological Consultants Inc. drilled two holes for Eagle Lake Resources Ltd. on the RESERVE property (33) to test a gravity anomaly associated with a copper-bearing skarn. Massive pyrite and pyrrhotite were encountered during the 1989 drilling.

Near Haines Junction, Harjay Exploration Ltd. investigated a copper occurrence previously drilled by Canadian Barranca Mines Ltd. on the ELLEN property (17). Massive chalcopyrite (copper-iron sulphide) occurs in three black shale layers. A chip sample across the mineralization assayed 8.55 per cent copper.

Nickel Exploration

All-North Resources Ltd. released a pre-feasibility study on its WELLGREEN nickel-copper-platinum property (13) in the Kluane Range. Drill-indicated, probable and possible geological reserves are approximately 42.3 million t grading 0.36 per cent nickel,

0.35 per cent copper, 0.51 g of platinum per t and 0.34 g of palladium per t. The pre-feasibility study indicated that 70 per cent of the deposit can be mined using low-cost open-pit methods with a low stripping ratio. Metallurgical tests indicated that 80 to 85 per cent of the nickel, 95 per cent of the copper and 70 per cent of the platinum and palladium can be recovered using conventional mill flotation technology.

Northeast of Mayo, Archer, Cathro and Associates (1981) Ltd. explored for sediment-hosted nickel for Inco Ltd. In 1987, unusual shale-hosted nickel mineralization was first discovered on the NICK property (38) and the search has extended for similar deposits.

Gold Exploration

In the Watson Lake area, Archer, Cathro and Associates (1981) Ltd. carried out rotary drilling on the HYLAND GOLD property (26) to confirm geological reserves previously estimated at 6.75 million t of oxide material grading 1.99 g of gold per t to a depth of 60 m. The property was being explored for the Hyland Gold Joint Venture comprising Silverquest Resources, NDU Resources Inc. and Adrian Resources.

In the Dawson area, Total Energold Corporation explored the O'BRIEN (5) property, where several swarms of arsenopyrite-rich veins containing gold occur along faults at the margin of the Antimony Mountain syenite intrusion. Diamond drill holes intersected several gold-bearing lenses.

Also in the Dawson area, Noranda Exploration Co. Ltd. explored several properties in the Ogilvie Mountains. On the BREWERY CREEK property (5), soil geochemistry, geophysics, trenching and diamond drilling were conducted.

United Keno Hill Mines Ltd. explored for gold mineralization in vein-faults with 89 rotary drill holes totalling 4 461 m and 15 diamond drill holes totalling 1 488 m on the QUARTZ CREEK (4) and GOLD BOTTOM CREEK (4) properties. No anomalous assays were returned.

On the SLEET property (8), at Clear Creek, J.C. Stephens Explorations Ltd. drilled an induced polarization (IP) anomaly for Secret Pass Minerals Corp. The best of four holes intersected 0.49 m which assayed 18.7 g of gold per t.

In the Mt. Freegold area, Doron Exploration Inc. completed six diamond drill holes near the CARIBOU CREEK (11) discovery. The holes returned values of up to 42.1 g of gold per t over 4.6 m.

At Big Creek, near Mt. Freegold, Archer, Cathro and Associates (1981) Ltd. drilled six holes to test the porphyry copper-gold potential beneath the 4 300 000 t NUCLEUS (11) low-grade oxide gold deposit. One drill hole intersected 38 m grading 0.87 g of gold per t and 0.52 per cent copper.

B.Y.G. Natural Resources Inc. released a feasibility study on the MT. NANSEN (12) gold deposit in 1989. Total reserves of almost 1 000 000 t are estimated in several zones. Four of the zones contain 575 979 t of proven and possible reserves grading 11.8 g of gold per t and 197 g of silver per t. The company was seeking financing to refurbish its 270 t per day mill and bring the property into production.

On the adjoining GOULTER property (12), owned by Aurchem Exploration Ltd., silver-lead bearing veins were identified in the main WILLOW CREEK zone.

Southwest of Mt. Nansen, Noranda Exploration Co. Ltd. explored the DOWS property (12), owned by prospector Eugene Curley. The 1989 work included magnetometer, IP surveys and one diamond drill hole.

An old showing near the head of Granite Creek was restaked by Eugene Curley as the GRIZZLY claims (11). Bulldozer trenching exposed a 6-m wide quartz-arsenopyrite vein, which yielded chip samples of 7.2 g of gold per t over 3.5 m.

South of Klaza River, Archer, Cathro and Associates (1981) Ltd. explored three new veins on the TAWA property (12), owned by B.Y.G. Natural Resources Inc. The best chip sample assayed 5.2 g of gold per t and 31.5 g of silver per t across 2.5 m.

In 1989, Omni Resources Inc. and Skukum Gold Inc. completed a preliminary mine evaluation of the SKUKUM CREEK (19) gold-silver deposit, located southwest of Whitehorse. The deposit contains geological reserves of 800 150 t grading 7.6 g of gold pert and 275 g of silver per t. The fully diluted mineable reserves amount to 465 393 t of approximately the same grades. The joint venture companies planned to put the property into production in 1989, but a general slump in equities markets during the year and the problem of acquiring a nearby mill delayed the project.

Also in the Wheaton River area, Mount Skukum Gold Mining Corporation conducted geological mapping, geochemistry and geophysical surveys south and west of the Mount Skukum Mine (19). Thirteen diamond drill holes tested the continuity of the previously-identified OCEAN, GOAT and TANGO veins. Four new areas were also identified including the anomalous WATUSI vein.

Immediately to the south of the Mt. Skukum property, Aurum Geological Consultants Inc. explored the EARL property (19) for Northern Minerals Ltd. and the adjoining CHARLESTON property (19) for Total Energold Corporation. Work in 1989 included trenching and geophysical surveys on both properties and mapping the old adits on the CHARLESTON property. One section of the CHARLESTON vein yielded 4.8 g of gold per t and 59.4 g of silver per t over a width of 0.48 m and length of 12.5 m.

Adastral Resources Ltd. reported that chip samples taken across the STEVE vein on its MACAULEY CREEK property (19) assayed 3 120 g of silver per t and 6.0 g of gold per t across 1.8 m.

Following an extensive geochemical sampling program, United Keno Hill Mines Ltd. drilled two anomalies on the JOE PETTY property (20) on Montana Mountain, where gold and silver occur in a brecciated quartz vein cutting altered volcanic rocks.

Northeast of Whitehorse, geological mapping was carried out on Larry Carlyle's MT. BYNG property (22), where gold and copper occur in vuggy, brecciated quartz carbonate veins.

Near Squanga Lake, south of Whitehorse, Dunvegan Exploration Ltd. explored a gold-bearing quartz-sulphide vein on the TOG property (21).

At Reed Creek (13) in the Kluane Range, Reed Creek Placers explored a large quartz-carbonate-graphite zone believed to be associated with placer gold nuggets found in the canyon.

Nathan Minerals Ltd. conducted a drilling program on the GLEN property (14) in the Burwash uplands.

Near Haines Junction, Harjay Exploration Ltd. obtained a gold assay from a sample of quartz vein material on the COLTON claims (17).

In the Ruby Range, United Keno Hill Mines Ltd. conducted soil samples and mapped three claim blocks on the RUBY property (15).

In the Rancheria area, Oropex Minerals Inc. trenched and sampled on the MATTHEW property (25).

In the Tintina Trench, Goldnev Resources Inc. completed a 10-hole, 1 164 m diamond drill program on the Main Zone deposit of the GREW CREEK property (b). Geological reserves have been estimated at 773 012 t grading 8.91 g of gold per t and 33.6 g of silver per t. Within this reserve, a high grade reserve of 184 948 t grading 12.14 g of gold per t has been identified.

Silver Exploration

High grade silver-lead-zinc veins occur on the MURNION silver property (24) near FARO. Bulldozer trenching in 1989 uncovered two narrow veins.

On the KINCORA property (16) at the head of Silver Creek, prospector Ron Stack blasted and trenched a stockwork of veins that yielded high assay values of silver, copper and zinc.

In the Wheaton River area, Graham Davidson obtained high-grade assay values of silver, lead and copper from a 1.5 m channel sample taken on the EVIEW property (18).

Jade Exploration

Jim Dodge mapped three nephrite serpentine bodies and packed about 300 kg of good quality jade from his LEE property (39) in the Campbell Range.

Max Rosequest mined about 70 t of jade on the KING property (40) near Watson Lake.

MINES AND MINERAL ACTIVITIES

Northwest Territories

Mineral Production

In 1989, mineral production was derived principally from six hard rock mines, composed of four gold mines and two zinc-lead mines. Production estimates for the mines are listed in Table 3. Although mine production at the Pine Point Mine ceased in 1987 and mill production in 1988, concentrates continued to be shipped from the Pine Point concentrator stockpile during the year.

The value of mineral production in the N.W.T. was estimated at $965.6 million in 1989 compared with $826.5 million a year earlier. Gold and silver prices were lower in 1989 compared with 1988, but both zinc and lead prices remained strong. Together, zinc and lead production accounted for 80 per cent of the total value of mineral production shipments while gold production accounted for 18 per cent.

Highlights of the N.W.T. mining scene included rapid progress on the construction of Northgate Exploration's 9000 t per day mill on its Colomac gold mine property and the commissioning of Treminco Resource's new 180 t per day mill at its Ptarmigan gold mine. Advanced exploration highlights included completion of the shaft and underground development at the Tundra property owned by Noranda Exploration Co. Ltd., Hemlo Gold Mines Inc. and Total Energold Corporation. Underground drilling was completed in October 1989 and the project was suspended. Can-Mac Exploration Ltd. drove a decline on the MON gold property and Cameron Mining Ltd. extended a decline at Burnt Island.

The mineral industry in the N.W.T. accounted for 25.6 per cent of the zinc, 13.6 per cent of the lead, 7.6 per cent of the gold and 1.6 per cent of the silver produced in Canada during 1989. The value of these metals combined with by-product bismuth and cadmium accounted for 6.6 per cent of Canada's metallic mineral production in 1989 compared with 5.9 per cent in 1988.

The six operating mines in the N.W.T. directly employed 1 692 persons during 1989 compared with 1 848 persons at seven operating mines in 1988.

Mines

Canada Tungsten Mining Corporation's tungsten mine at Cantung, N.W.T. remained on a care-and-maintenance basis throughout 1989. Depending on the market for tungsten, production could be resumed within a four-month period. The proven and probable reserves at the Cantung mine are 1 400 000 t grading 1.20 per cent tungsten trioxide (WO_3).

Cominco Ltd. and Pine Point Mines Limited, Polaris Mine

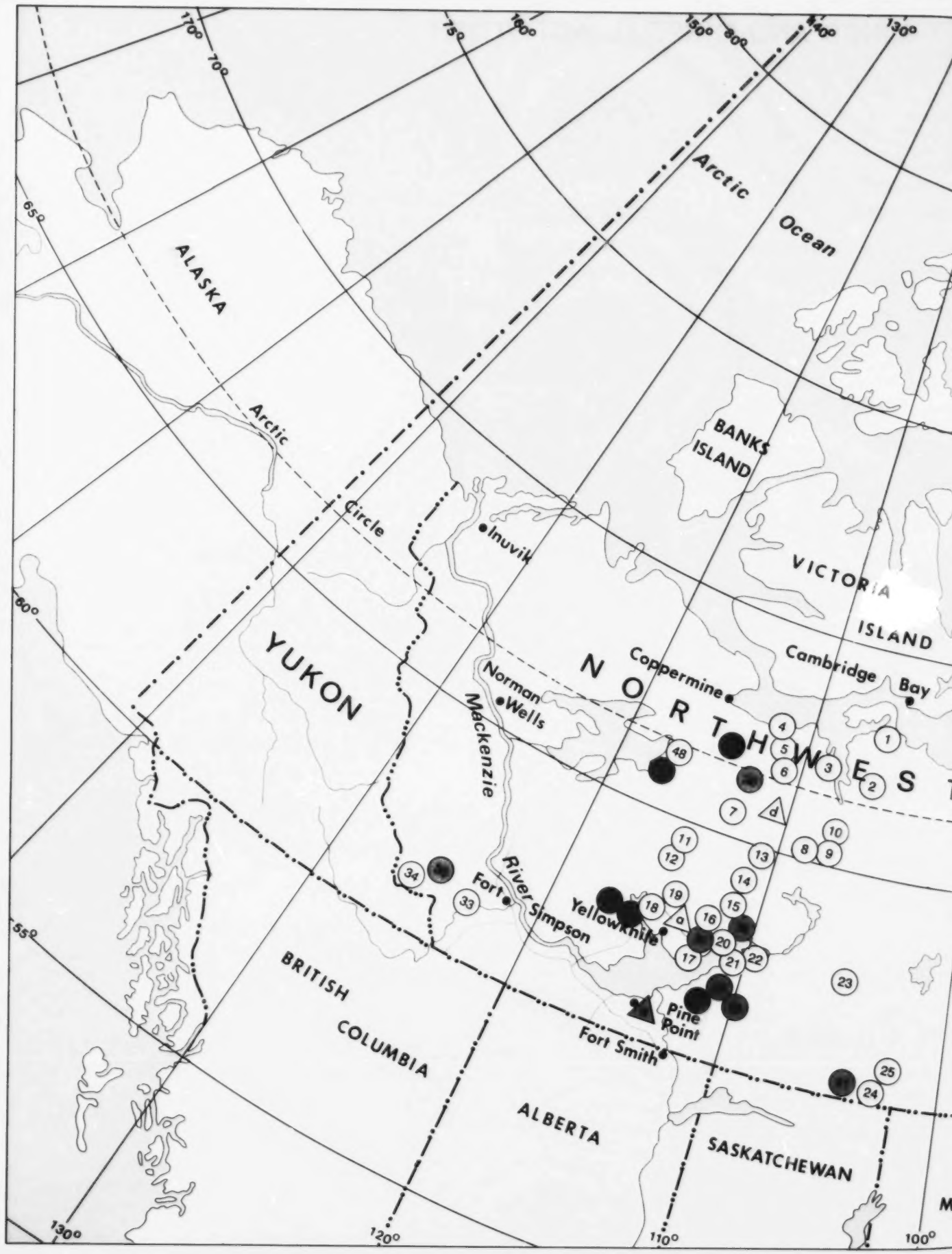
The Polaris zinc-lead mine (b)* on Little Cornwallis Island, is the western world's most northerly base metal mine. The Polaris Mine joint venture operation of Cominco Ltd. (55 per cent) and Pine Point Mines Ltd. (45 per cent) set annual production records in 1989 for both tonnage milled and zinc concentrate produced. The Polaris mill processed 1 023 300 t of ore for an output of 224 500 t of zinc concentrate and 41 000 t of lead concentrate. The increased concentrate production were primarily attributable to higher ore grades of 14.1 percent zinc and 3.5 per cent lead compared with 13.8 per cent zinc and 3.7 per cent lead a year previously. Contained metal produced in 1989 was approximately 139 190 t of zinc and 32 062 t of lead. Ten shipments of concentrate by bulk carriers were made to Europe between August 1 and October 25, 1989, for a record total of 267 400 wet t. During the year, the installation of a $4.4 million crushing and conveying system was completed to provide for the transport of ore from the bottom of the ore body to the concentrator.

Type:	underground
Location:	Little Cornwallis Island (120 km northwest of Resolute)
Mill Capacity:	2 100 — 3 100 tpd
Tonnes Milled:	1 023 000 t
Reserves:	13.095 million t (December 31, 1989)
Reserve Grade:	14.3 per cent zinc, 3.8 per cent lead
Employees:	267 (December 31, 1989)

Echo Bay Mines Ltd., Lupin Mine

The Lupin gold mine (d) is located 90 km south of the Arctic Circle and approximately 400 km northeast of Yellowknife. In 1989, the Lupin mill processed 1 717 t of ore per day with an average grade of 10.32 g of gold per t. This compares with 1 687 t of ore per day

* Numbers or letters in parenthesis indicate the location of the property on the map of the Northwest Territories in the centrefold.


ALASKA
Arctic Ocean
Arctic Circle
BANKS ISLAND
VICTORIA ISLAND
Inuvik
Coppermine
Cambridge Bay
Norman Wells
YUKON
NORTHWEST
Mackenzie River
Fort Simpson
Yellowknife
Pine Point
Fort Smith
BRITISH COLUMBIA
ALBERTA
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130°
120°
110°
100°
70°
65°
60°
55°

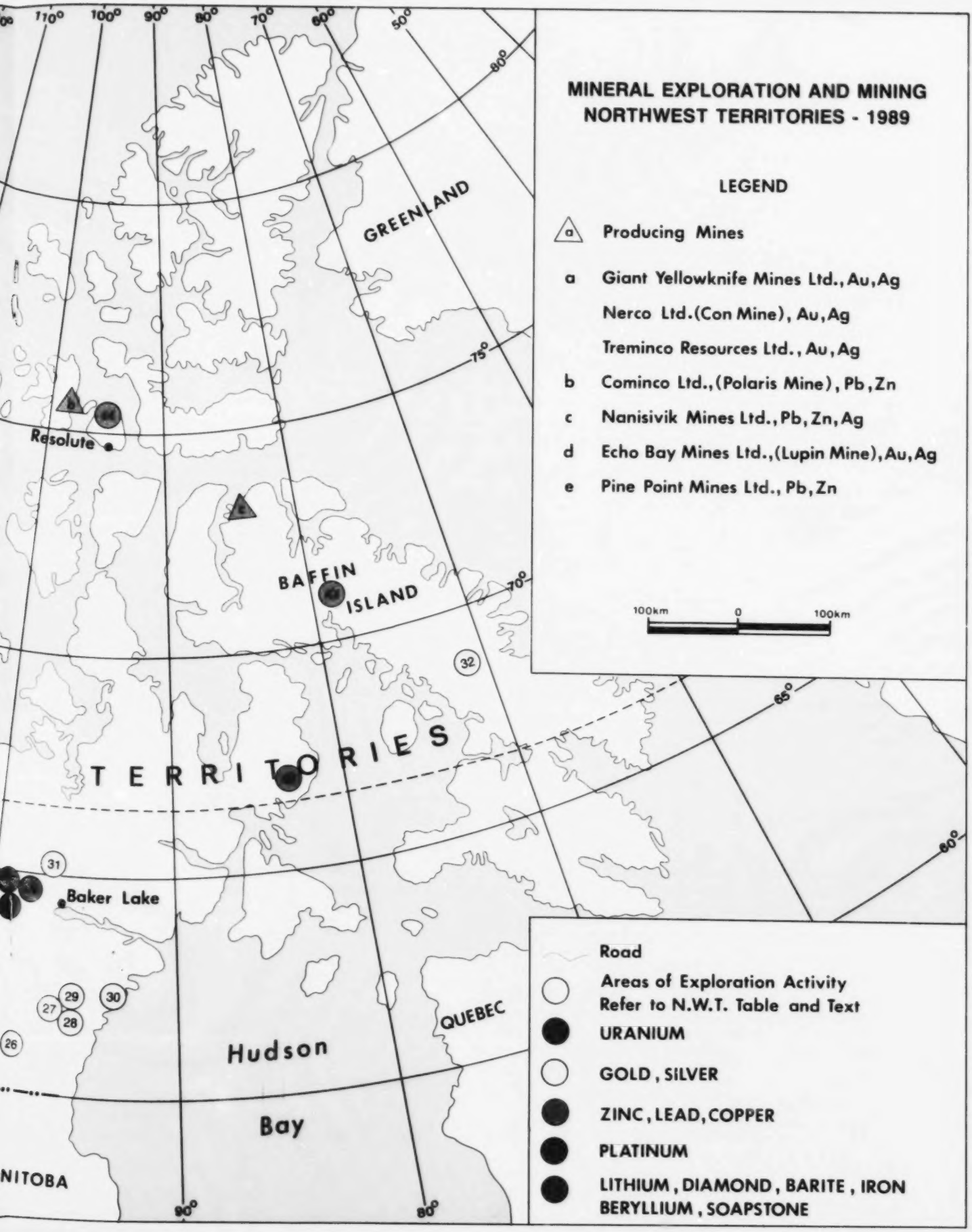
MINERAL EXPLORATION AND MINING
NORTHWEST TERRITORIES - 1989
LEGEND
Producing Mines
a Giant Yellowknife Mines Ltd., Au, Ag
Nerco Ltd.(Con Mine), Au, Ag
Treminco Resources Ltd., Au, Ag
b Cominco Ltd.,(Polaris Mine), Pb, Zn
c Nanisivik Mines Ltd., Pb, Zn, Ag
d Echo Bay Mines Ltd.,(Lupin Mine), Au, Ag
e Pine Point Mines Ltd., Pb, Zn
100km 0 100km
Road
Areas of Exploration Activity
Refer to N.W.T. Table and Text
URANIUM
GOLD, SILVER
ZINC, LEAD, COPPER
PLATINUM
LITHIUM, DIAMOND, BARITE, IRON
BERYLLIUM, SOAPSTONE
GREENLAND
BAFFIN ISLAND
TERRITORIES
Resolute
Baker Lake
Hudson Bay
QUEBEC
NITOBA
110°
100°
90°
80°
70°
60°
50°
80°
75°
70°
65°
60°
90°
80°
32
31
29
30
27
28
26

Table 2:
Mineral Production of Operating Mines in the Northwest Territories, 1987, 1988 and 1989

Company, Mine and Commodity	1987 t	1987 kg	1988 t	1988 kg	1989(P) t	1989(P) kg
Cominco Ltd.						
Polaris Mine						
zinc	128 800		134 800		139 190	
lead	26 500		34 200		32 060	
Echo Bay Mines Ltd.						
Lupin Mine						
gold		6 006		6 297		6 082
silver		882		N/A		N/A
Giant Yellowknife Mines Ltd.						
Giant Mine						
gold		2 380		2 224		3 270
Nanisivik Mines Ltd.						
Nanisivik Mine						
zinc	57 900		63 100		57 328	
lead	2 500		1 000		2 448	
silver		23 000		22 200		16 956
Nerco Con Mine Ltd.						
Con Mine						
gold		2 576		2 551		2 992
silver		622		510		621
Treminco Resources Ltd.						
Ptarmigan Mine						
gold		102		416		478
silver		10		N/A		N/A

Source: Department of Indian Affairs and Northern Development. These figures are those reported by the mines as production and will not match Statistics Canada's production figures which are based on metals sold or shipped.

N/A = Not available — = Nil

(P) = Preliminary

and 10.59 g of gold per t a year earlier. The mine shaft deepening program continued. At year end, the shaft was deepened to the 3 120 foot depth (951 m) and deepening will extend to the 4 000 foot depth (1 219 m) in 1990.

Type:	underground
Location:	400 km northeast of Yellowknife
Product:	gold
Mill Capacity:	1 600 — 2 000 tpd
Tonnes Milled:	1 717 tpd
Reserves:	41 834 kg of gold
Reserve Grade:	10.62 g/t gold
Employees:	408 (December 31, 1989)

Giant Yellowknife Mines Ltd., Giant Mine

In 1989, the mill at the Giant gold mine (a) processed 357 409 t of ore at an average grade of 7.53 g of gold per t for an output of 2 583.9 kg of gold. This compares with 322 490 t of ore averaging 6.56 g of gold per t in 1988. The tailings retreatment operation contributed 686.5 kg, so that gold production from both conventional and tailings retreatment amounted to 3 270.4 kg in 1989 compared with 2 223.6 kg in 1988. The increased output in 1989 resulted from increased tonnage to both facilities and a higher grade from conventional production.

Tailings retreatment, originally designed for 9 070 t per day, was limited by frozen conditions at depth within the in situ tailings. Throughput in 1989 was 992 644 t of tailings grading 2.08 g of gold per t and recovery of 28.6 per cent. The retreatment plant operated from mid-May to the beginning of October.

Type:	underground and open pits
Location:	2.4 km north of Yellowknife
Product:	gold
Tonnes Milled:	357 409 t
Reserves:	2.896 million t (December 31, 1989)
Reserve Grade:	8.62 g/t gold
Tailings Re-treatment Plant	
Capacity:	9 070 tpd
Tonnes Processed:	922 644 t
Reserves:	5.09 million t (December 31, 1989)
Reserve Grade:	2.18 g/t gold
Employees:	400 (December 31, 1989)

Nanisivik Mines Ltd., Nanisivik Mine

Production at the Nanisivik Mine (c) in 1989 amounted to 706 000 t of ore grading 8.4 per cent zinc compared with 675 900 t grading 9.7 per cent in 1988. Approximately one half of the ore came from the main ore body and the remainder from satellite deposits. Zinc concentrate production in 1989 declined to 103 500 t from 113 100 t in 1988, reflecting the effect of a planned reduction in mining grade. Concentrate shipments in 1989 amounted to 96 400 t of zinc and 4 200 t of lead compared with 127 700 t of zinc and 1 300 t of lead in 1988. The lower tonnage delivered in 1989 was a result of no carry over of inventory, lower concentrate production and the last concentrate shipment scheduled in November was not made due to ice conditions at Nanisivik.

Type:	underground
Location:	27 km east of Arctic Bay, Baffin Island
Product:	zinc, lead, silver
Mill Capacity:	2 000 tpd
Tonnes Milled:	706 000 t
Reserves:	2.98 million t (December 31, 1989)
Reserve Grade:	8.5 per cent zinc, 0.39 per cent lead, 41 g/t silver
Employees:	198 (December 31, 1989)

Nerco Con Mine Ltd., Con Mine

The Nerco Con Mine (a) produced 2 992 kg of gold and 621 kg of silver from 243 620 t of ore milled in 1989. In 1988, the company produced 2 551 kg of gold and 510 kg of silver. The production increase coupled with a dramatic reduction in production costs resulted from projects started in 1987 to modernize and renovate the operation, control costs and improve productivity. A new headframe and renovated shaft completed in 1989 at the Con Mine will increase the mine's ore-hoisting capacity by 20 per cent and permit access to new mine areas.

Type:	underground
Location:	1.4 km south of Yellowknife
Product	gold, silver
Mill Capacity:	650 tpd
Tonnes Milled:	243 620 t
Reserves:	2.26 million t (December 31, 1987)
Reserve Grade:	10.42 g/t gold
Employees:	374 (December 31, 1989)

Pine Point Mines Limited, Pine Point Mine

Milling at the Pine Point zinc-lead mine (e) was discontinued during the summer of 1987. In 1989, rail car loading of concentrate, that was stockpiled at the Pine Point concentrator for delivery to smelters, continued. Zinc concentrate sales were 233 900 t and lead concentrate sales were 3 100 t. Inventories at year-end 1989 were 101 900 t of zinc concentrate and 18 200 t of lead concentrate. Zinc concentrate sales are expected to be completed by the third quarter of 1990, and lead concentrate sales are expected to continue into 1991 before the stockpile is depleted. Reclamation activities continued through 1989 at the Pine Point operation and town site.

Treminco Resources Ltd., Ptarmigan Mine

The headframe at the company's Ptarmigan Mine (a) was completed in January and the hoist was installed in May 1989. The shaft was operational to the 450-foot (137 m) level and was being rehabilitated from the 450-foot to the 600-foot (183 m) level. Production during calendar year 1989 amounted to 478.5 kg of gold compared with 416.5 kg of gold a year earlier. The company started up its new 180 tpd concentrator at the mine site in June 1989. In the first half of 1989, all ore was sold to Giant Yellowknife Mines Ltd. for custom milling at the Giant concentrator. In the 12 months ended July 31, 1989, mill production amounted to 40 324 t with an average grade of 14.2 g of gold per t. Although no production came from the company's Tom gold mine, 1.6 km from the Ptarmigan Mine, part of the company's reserves are contained in an ore block in the Tom Mine containing approximately 4 500 t grading 7.78 g of gold per t.

Type:	underground
Location:	20 km east of Yellowknife
Product:	gold
Mill Capacity:	180 tpd
Tonnes Milled:	40 324 (July 31, 1988 to July 31, 1989)
Reserves:	106 140 t (July 31, 1989)
Reserve Grade:	10.58 g/t gold
Employees:	45

Development

The Tundra underground exploration development program, which began in July 1988 was completed in December 1989. The Tundra property is owned by Noranda Exploration Co. Ltd., Hemlo Gold Mines Inc. and Total Energold Corporation. A 476-m, two-compartment vertical shaft was sunk and 767.4 m of drill drifts, 359.7 m of cross-cuts, 629.2 m of ore drifts and six raises totalling 131.3 m were driven. Some 125 underground diamond drill holes (26 664.9 m) and 36 bazooka holes (582.2 m) were drilled and a 1 283 t bulk sample was prepared. Results from this work, coupled with extensive metallurgical test work and a pre-feasibility study, indicated that the Tundra gold deposit (14), although containing a large inventory of gold, is too low grade and discontinuous to be economic at current (1989) prices. The potential remains for high-grade reserves on the large claim group.

Northgate Exploration Ltd's affiliate ABM Gold Corp., at years-end 1989, had completed 90 per cent of the construction at its Colomac gold mine project (11), located 219 km north-northwest of Yellowknife. Capital cost of the project was later reported at $166 million. Initial production from the 9 020 tpd mine and mill is scheduled for the second quarter of 1990. The plant is designed to produce 6 200 kg of gold annually. Open-pit reserves for the deposit were announced in January 1989 as 25 million t grading 1.9 of gold per t. The Colomac project is supplied by a winter ice road for three months of the year and by aircraft on a year-round basis. During the year, Neptune Resources Corp. was amalgamated with Northgate's 50 per cent-owned ABM Gold Corp.

Mineral Exploration

Mineral exploration expenditures in the N.W.T. were estimated at approximately $55.5 million in 1989 compared with $112.6 million in 1988. The decline was ascribed to changes in flow-through financing, a decline in the price of gold, a general weakness in North American stock markets and a freeze in claim staking in the area north of Great Slave Lake as part of the Dene-Metis land claim settlement. In 1988, claim staking declined from 1 098 claims to 500 claims, but Slave Structural Province, lying north of Great Slave Lake was the most active staking and exploration region. There was a reduction in the number of properties explored in 1989 to 121 compared with 157 in 1988. The number of properties drilled declined to 48 in 1989 compared with 69 in 1988. Gold continued to be the leading target commodity, accounting for 99 exploration projects. Silver and base metals accounted for 22 projects. Last year only seven base metal properties were explored.

Among the promising exploration projects were the drilling of the Nicholas Lake, Viking, Goodwin Lake (Kam claims) and Mon gold properties in the Clan Lake — Discovery area of the Yellowknife volcanic belt. A decline was driven on the Mon property. Also, at the south end of this area, Treminco Resources Ltd. plans to mine the Crestaurium gold property in 1990.

Exploration Projects

Southern Slave Structural Province, Indin Lake Area: Gold Exploration

Northgate Exploration Ltd.'s affiliate ABM Gold Corp. continued construction of the Colomac Mine (11), 212 km north-northwest of Yellowknife. Production is scheduled to being in the second quarter of 1990. The company continued exploration of its mine properties with approximately 5 000 m of drilling and ground geophysics. During this year, ABM Gold Corp. acquired majority control of the Neptune Resources Corporation.

At Mesa Lake, Noranda Exploration Co. Ltd. completed VLF-EM, IP and ground magnetometer surveys and soil sampling on the MESA1-5 claims (11).

Etruscan Enterprises Ltd. conducted magnetometer and VLF-EM surveys on the AZTEC, KING, GOLDEN PRINCE, SOUTH, INDIN and LEX claims (11).

On the INDIN claims (12), near Indin Lake, Noranda Exploration Co. Ltd. conducted EM and ground magnetometer surveys. At Norris Lake on the NOR 1-5 claims (12), the company completed magnetometer and EM surveys and approximately 500 m of drilling.

Russell Lake Area: Gold Exploration

Echo Bay Mines Ltd. drilled 1 500 m on the SP claims (18), under option from Aber Resources Ltd.

Covello-Bryan and Associates Ltd. geologically mapped the RUST, ISL, CHANCE, TIP and APEX claims (18) for Pacific Northwest Resources Inc.

Fortune Minerals completed an airborne geophysical survey over the YELLER claims (18) and conducted follow-up ground geophysics.

In the Wheeler Lake area, Hidden Lake Gold Mines Ltd. competed reconnaissance geological mapping of the GERM claims (19). Three iron formations along an 11-km strike length were gridded and mapped. One 3-m chip sample averaged nine g of gold per t.

Courageous Lake Volcanic Belt: Gold Exploration

A joint venture among Noranda Exploration Co. Ltd. (25.5 per cent), Hemlo Gold Mines Inc. (25.5 per cent) and Total Energold Corp. (49 per cent) continued its major underground exploration project on the Tundra gold deposit (14). The exploration work included completion of the 476-m vertical shaft, 1 890 m of underground development on the 425 m level, the mining of three bulk samples and over 27 000 m of underground diamond drilling. The joint venture concluded that while the Tundra deposit represents a large gold inventory, the grade of ore encountered would not permit a production decision in 1990. Surface exploration work on the TUNDRA property consisted of ground-magnetometer, VLF-EM and IP surveys as well as approximately 200 m of drilling.

Battle Mountain Gold Company conducted reconnaissance mapping, sampling and ground geophysics on the MOG claims (14).

Yellowknife Greenstone Belt: Gold Exploration

Golden Marlin Resources Ltd. drilled on the HOPE claims (a), in Yellowknife Bay, to test shear zones delineated by seismic and IP surveys.

Nerco Con Mines Ltd. continued to explore its mining leases by underground and surface drilling of the Negus Shear Zone and NEGUS property (a).

Giant Yellowknife Mines Ltd. completed 92 short holes totalling 4 000 m to explore for open-pit reserves on its GIANT property (a).

Nathan Minerals conducted VLF-EM and magnetometer surveys on its ANN and PRO claims (a).

Kelmet Resources Ltd. continued exploration on the Walsh Lake property (a) by prospecting and drilling.

On the MON property (a), at the north end of Discovery Lake, Can-Mac Exploration Ltd. drilled 1 000 m to test auriferous quartz veins. The drill program was followed by development of a decline and raise totalling 100 m, to obtain a 3 000 t bulk sample.

Dave Webb prospected and mapped the NEL 1 claim (a).

At Sito Lake (a), Noranda Exploration Co. Ltd. carried out an IP survey, soil sampling and 700 m of diamond drilling. On the CUR claims, near Sito Lake, the company also conducted an IP survey and drilled approximately 450 m.

Yellowknife Basin Area: Gold Exploration

Teminco Resources Ltd. conducted a drilling program on its mining lease to explore the southwestern and northeastern extensions of the Ptarmigan (a) vein and to drill other parallel veins located between the Ptarmigan and Tom veins. Treminco reported ore-grade intersections on the No. 2 vein and conducted exploration drifting on the TOM vein.

Kelmet Resources Ltd. conducted VLF-EM and magnetometer surveys on the CJ 2 and JAK 1 claims and prospected the CADEN 1 claim (a).

Hecla Canada Ltd. re-sampled the gold and base metal potential of the KA 1-3 and PAN 1-2 claims (a).

Aber Resources Ltd. and Continental Pacific Resources Ltd. completed mapping, an IP survey and trenching on the VAD and VAD 1-3 claims (a), at Goodwin Lake.

Kamsal Mining Corp. drilled the KAM 1-5 claims (a) west of Goodwin Lake.

Canamax Resources Inc. mapped and drilled the VIKING property (a), south of the old Discovery mine.

Athabaska Gold Resources Ltd., the operator, and Chevron Minerals Ltd. continued exploration on their Nicholas Lake property (a), 90 km north of Yellowknife. Geological mapping, ground and airborne magnetometer and EM surveys, an IP survey, trenching and drilling of 42 holes, totalling 4 072 m were completed. Drill-indicated reserves were reported as 557 000 t grading 12.16 g of gold per t. Together with inferred reserves, the reserve totals 1 114 000 t grading 12.2 g of gold per t.

At Burnt Island, Gordon Lake area, Cameron Mining Ltd. conducted an underground exploration program on New Era Developments Ltd.'s property (16). The program included driving a decline to the 30 m level, drifting and raising on the No. 1 vein to obtain a 2 500 bulk sample.

Mt. Grant Mines Ltd. conducted preliminary mapping and sampling on the Bullmoose Lake gold mine property (17).

Hidden Lake Gold Mines mapped and trenched on its leases and claims in the Ruth Mine area (17).

Cameron River and Beaulieu River Volcanic Belts: Gold and Base Metals Exploration

North of Fenton Lake, Freeport-McMoran Gold Company drilled nineholes totalling approximately 1 200 m, on the LONGSPUR claims (16), to test a gold showing.

On the Allan Lake property (16), optioned from Durga Resources Limited, Noranda Exploration Co. Ltd. conducted geochemical and geological mapping, Max-Min EM and magnetometer surveys.

Pamorex Minerals Inc. prospected the AP and RED claims (16).

Aber Resources Ltd. completed geological mapping and geophysical surveys on its polymetallic massive sulphide projects in the Victory Lake area (37). The company plans to drill the EMILY claim in 1990.

In the Turnback-Tumpline Lakes area, Strathcona Mineral Services Ltd. optioned claims from Aber Resources Ltd. and Kelmet Resources Ltd. that cover base metal showings (37). Strathcona conducted geological mapping, geochemistry, magnetometer, Max-Min EM and VLF-EM surveys, all as a follow-up to an airborne geophysical survey.

Hidden Lake Gold Mines Ltd. prospected the JE claims (37) south of Tumpline Lake.

Noranda Exploration Co. Ltd. conducted detailed geological mapping and drilled one hole on the SUNSET SOUTH claims (37). Noranda also mapped and sampled in the Sunset Lake area and drilled other base metal targets, including 1 100 m on the SHEET claims (37), optioned from Kelmet Resources Ltd., 250 m on the SUN claims, optioned from All Gold Mines Ltd. and 450 m on it's FEDED property. Noranda also drilled 800 m and completed a gravity survey on its SUNSET NORTH property. At the Sunrise deposit (37), Noranda drilled 12 holes totalling 3 600 m and completed magnetometer, EM and gravity surveys.

Continental Pacific Resources Inc. found two new showings of zinc-copper mineralization on its LARK property (37). The company completed geological mapping, IP, Max-Min, EM and VLF-EM surveys. Drilling of the LARK deposit was planned to resume in early 1990.

Cominco Ltd. mapped and sampled the RUBY claims (15).

Camsell Lake Area: Gold Exploration

Hidden Lake Gold Mines completed a prospecting project on the NANCY, CAM, CINDY and CANOE claims (15).

Indian Mountain Lake Area: Base Metals Exploration

At Indian Mountain Lake, 172 km east-northeast of Yellowknife, Ego Resources Limited and Asquith Resources Inc. completed 3 636 m of drilling on the BB Lake deposit (38), a volcanogenic massive sulphide deposit discovered in 1948. The drilling confirmed both known grades and widths of the deposit. Ego Resources planned to resume drilling in 1990 to test the depth potential of the BB Lake zone which has a 1969 reserve estimate to a depth of 198 m of 880 000 t grading 9.5 per cent zinc, 0.7 per cent lead and 116.6 g of silver per t.

The company will also test the depth potential of the Kennedy Lake zone, 500 m to the west of the BB Lake zone. The former zone has a 1969 reserve estimate to a depth of 76 m of 635 000 t grading 6 per cent zinc, 1 per cent lead and 171.4 g of silver per t.

Northern Slave Structural Province: Gold and Base Metals Exploration

The Back River Joint Venture composed of Homestake Mining Company and Kerr McGee Corporation conducted an airborne geophysical survey over Prospecting Permits 1168, 1169 at Nose Lake (8), the SAW 1-4 claims at Saw Lake (8) and the MR 1 and BRAU 61-69 claims in the Malley Rapids — Needle Lake area (9). The anomalies defined were followed up by ground geophysics and prospecting.

BHP-Utah Mines Ltd. drilled and conducted geological mapping, magnetometer, VLF-EM and IP surveys on the CROWN claim and the adjoining DEN claims (6). The claims were optioned from Aber Resources Ltd.

BPH-Utah Mines also conducted the same types of geophysical surveys on the ULU claims (6), west of the CROWN claims. On the ARNICA claims and Prospecting Permit 1181 in the Anialik River (5) belt, the company's program comprised mapping, prospecting, magnetometer and VLF surveys. West of Bathurst Inlet, the company prospected parts of Prospecting Permit 1118 (3).

BHP-Utah Mines mapped and prospected in the High Lake Volcanic Belt on the BRAVO and CAIRO claims and staked the CYGNET claim (5). On the Hood River, the company mapped and prospected Permit 1146 (6). The company also conducted some short hole drilling on the BRAD claims (d), northeast of Contwoyto Lake.

Bre-X Minerals Ltd. prospected anomalies outlined by a 1988 Questor airborne geophysical survey. The company mapped and prospected the ED claims at Migration Lake and the RED claims (8), 30 km to the east. Orientation magnetometer and VLF-EM surveys were completed at two locations.

Chevron Minerals Ltd. trenched and sampled the TURNER and TURN claims (3) at Turner Lake. Four drill holes were completed to check previously-drilled, high-grade core intersections. Chevron also completed a structural study of the FARN and KNUT claims (3) at Pistol Lake.

Cominco Ltd. conducted rock sampling and both magnetometer and HL-EM surveys on the PRO claim (d).

The Cominco Ltd.-Cogema Ltd. Joint Venture explored the COCO claims (d) northeast of Contwoyto Lake by drilling, geological mapping, HL-EM and magnetometer surveys. The JON claim (d) was also explored by drilling.

Cominco Ltd. in a joint venture with Westview Resources Ltd. mapped, sampled and drilled the REN claims (7). In 1988, possible geological reserves outlined by drilling amounted to 1.09 million t grading 6.52 g of gold per t. One hole drilled in 1989 expanded the possible reserves.

Continental Pacific Resources Ltd. explored its properties in the High Lake and Anialik River belts, including the HIL and CHARLY claims (5), the CHAR, MIST and TAM claims (4), and the ALF and CHARLIE claims (5). Prospecting, sampling and geological mapping were conducted on all of these claim blocks and, in selected areas, magnetometer, VLF-EM and HL-EM surveys were conducted.

Contwoyto Goldfields Ltd. conducted a soil and rock geochemical survey on the IF claims (d).

Echo Bay Mines Ltd. drilled in the Leanne Lake area (7) and on the Lupin Mine lease (d).

Falconbridge Nickel Ltd. explored the HOOD claims (36) by a lithogeochemical survey.

The George Lake Joint Venture, composed of Homestake Mining Company Ltd. and Kerr McGee Corporation tested iron formation by drilling at three locations in the George Lake area (10). Magnetometer and VLF-EM surveys were conducted at five locations in the George Lake area and 25 km to the southeast, in the Boot Lake area (10).

Hecla Mining Company of Canada Ltd. explored the JOHN, SHIN, DLER, CAMP and ADD claims (d) at Contwoyto Lake by geological mapping, soil sampling and IP surveys.

Orofino Resources Ltd. drilled on the ARCADIA property (4), on Coronation Gulf.

Sirius Energy Corporation explored the Esker Lake, MUSKOX claims (8). Work included trenching, magnetometer and VLF-EM surveys and drilling, all as a follow-up to a Questor airborne geophysical survey conducted in 1988. At the FIRE claims (9), in the Regan Lake-Fiddler Lake area, the company resampled anomalous areas outlined by a Questor airborne geophysical survey, also conducted in 1988.

Bear Structural Province and East Arm of Great Slave Lake: Gold, Platinum and Beryllium Exploration

CEGB Exploration (Canada) Ltd. flew an EM survey over the BUD (48), BULLY and BULLWINKLE claims (49). Anomalies were followed up by ground geophysics, trenching and sampling on the BUD property, where the target was gold. On the BULLY and BULLWINKLE claims, the target was Port Radium-type silver, uranium, copper, cobalt and nickel deposits.

International Platinum Corporation drilled on the OX claims (53), on the Muskox intrusive complex. The target was platinum-group metals.

In the eastern arm of Great Slave Lake, Leeward Capital Corp. explored gold projects on the REX claims (22) at Meridian Lake.

Kelmet Resources explored claims at Lac Duhamel near Snowdrift (21).

MPH Consulting Ltd. conducted geophysical surveys of BBX Resources Ltd.'s claims near Taltheilei Narrows (20).

A decision on development of the Thor Lake (17) beryllium-rare earth project of Highwood Resources Ltd. and Hecla Mining Co. was suspended pending a marketing study.

District of Keewatin and Part of Southeastern District of Mackenzie

Snowbird Lake-Ennadai Lake Volcanic Belt; Gold, Base Metals and Uranium Exploration

Taiga Consultants Ltd. conducted exploration for gold on claims and prospecting permits near Snowbird Lake (25) and Atzinging Lake (24). The work was conducted on behalf of Courageous Exploration Ltd. on properties optioned from Comaplex Resources International Ltd. and Leeward Capital Corp.

W.A. Hubackek Consultants Ltd. conducted regional exploration work in the Rochon Lake-Kasba Lake area (25) for Agnico Eagle Mines Ltd.

Athabaska Gold Resources Ltd. sampled boulders on the ESK and ENN claims near the N.W.T.-Saskatchewan border (24) for precious and base metals.

District of Keewatin

BHP-Utah Mines Ltd. continued exploration for gold in the Kaminak Lake area (28) on two prospecting permits and on claims staked in 1988. Work included till geochemistry, prospecting, mapping, sampling, Max-Min EM and VLF-EM surveys and airborne magnetic and DIGHEM surveys.

Comaplex Resources International Ltd. explored the Woodburn Group (31) northwest of Tehek Lake for gold. Exploration included magnetometer, VLF-EM and Max-Min EM surveys together with a 1 500 m diamond drill program.

Dejour Mines Ltd., operator of the Turquetil Lake Project, in joint venture with Noble Peak Resources Ltd. explored the Turquetil Lake properties (27). An IP

survey was conducted over the main showing where previous exploration had outlined gold mineralization.

Inco Gold Ltd. returned to its IGLOO claims near Wilson Bay (30). Exploration work included mapping, sampling, IP surveys and a 1 610 m diamond drill project.

Noble Peak Resources Ltd. concentrated on the Southwin Venture property at Quartzite Lake (29). The Mac and Cache zones were the main exploration targets with 500 m of drilling on the Mac zone. On the Cache zone, probable reserves are 236 000 t grading 9.60 g of gold per t and possible reserves are 127 600 t grading 8.9 g of gold per t.

Noranda Exploration Company Ltd. explored the DEB, DEM and JEN claims (26) near Otter Lake by prospecting, mapping, trenching and sampling.

Sikaman Gold Resources Ltd. continued operations at Kaminak Lake (29) and Maze Lake (30). Exploration work on the KAM, MAZE and NORSIK claims included magnetometer surveys, mapping and sampling.

A positive feasibility study was announced for the Kiggavik uranium mine project of the joint venture partners Urangesellschaft Canada Ltd. and CEGB Exploration (Canada) Ltd. (45). Development of the open-pit mine, south of Schultz Lake, was being reviewed by a Federal Environment Assessment Review Office public hearing process in 1989.

Joint venture partners Urangesellschaft, CEGB Exploration (Canada) Ltd. and PNC Exploration (Canada) Ltd. explored the North Sissons property (45), northwest of Judge Sissons Lake. Exploration of the three prospecting permits included mapping, DIGHEM IV, resistivity, gravity and radiometric surveys and over 5 900 m of drilling.

PNC Exploration (Canada) Ltd. in joint venture with BP Resources Ltd. explored the L claims (45) south of Schultz Lake, with EM, magnetometer and gravity surveys. Over 1 000 m was drilled.

PNC and CEGB Exploration (Canada) Ltd. jointly conducted exploration on the west Schultz project (47), including mapping and sampling.

Talston Magmatic Zone

In the Talston magmatic zone, east of Great Slave Lake, prospector James Price conducted a radiometric survey of the REO claim (50).

At Rutledge Lake (39), BHP-Utah Mines Ltd. sampled and mapped nickel-copper-platinum group element prospects, optioned from Enexco International Ltd.

Nonacho Basin

In the Nonacho Basin, Fortune Minerals Ltd. explored gold-silver-copper-lead-zinc deposits on the FD claims at Salkeld Lake (40).

Solid Resources Ltd. optioned, sampled and mapped the Thye Lake nickel-copper deposit (41).

Arctic Islands Region: Base Metals Exploration

In the central Arctic, Cominco Ltd. drilled a zinc-lead deposit on Truro Island (b) and continued its ore delineation drilling at the Polaris Mine (b), on Little Cornwallis Island.

Nanisivik Mines Ltd. continued to explore for new ore deposits on the Nanisivik Mine property (c), Borden Peninsula, Baffin Island. The company also explored a 15 000 sq. km area of north central Baffin Island from a base camp at Mary River (43).

Borealis Exploration Ltd. explored prospecting permits near Nagvaak (Naquak) Lake (42), southeastern Melville Peninsula, for base metals.

Cordillera Region: Gold and Other Exploration

Sirius Resources Corp. and Verdstone Gold Corp. explored the SELENA CREEK property (34) for placer gold. Encouraging results from test pits resulted in the staking of a large claim block in the Caribou River area. A summer survey was completed along Selena Creek and test pitting was conducted to estimate the volume of potential gold-bearing gravel.

Liard River Exploration and Mining Co. tested gravel bars for placer gold on its claims on the Liard River (33).

Procan Exploration Co. Ltd. geologically mapped and geochemically sampled the AX, DOG and MITERK claims (35).

M.R. Vulimiri completed geological mapping, soil sampling and a VLF-EM survey on the CHUCK-1 claims (34).

Metal Prices

The focus of this section of the report is to provide some information about the prices and the markets for the metals and minerals produced in the Northwest and Yukon territories. Lead, zinc and silver are produced and exported in concentrate form. Gold, including most placer gold, is exported as dore bars or crude placer gold for further refining outside of the territories.

The metal concentrates produced in the territories are sold and shipped to metal smelters mainly in Europe and Asia as well as the United States. These concentrates are normally sold to smelters under long-term contracts, the conditions of which are negotiated annually. While each concentrate sales contract is different, all contracts contain similar conditions with regard to: when, where and how much concentrate will be delivered; what smelter charges will be levied or how much of the metal contained in the concentrate will be payable; what penalties for undesireable metals or credits for minor metals will be levied; which metal price will be used for payment; and what the timing of payment will be.

At the time of contract negotiations, the smelter charges are agreed upon along with an escalation/reduction formula. This formula allows for changes in metal prices when the contract is signed and when the concentrates are actually delivered. Smelters pay for the concentrates based on the average metal price usually for the month following delivery.

Most conditions of the sales contracts are confidential between the buyer and the seller, due to the highly competitive nature of the mining and metals industry. The metal price that will be used for final payment calculation is the one condition of the contract based on public information. Often the average of a quoted metal price from the London Metal Exchange (LME), the Commodities Exchange (COMEX), or the North American Producers' price depending on the point of sale and the metals involved in the contract. These prices are published in the major mining industry trade journals.

The London Metal Exchange in London, England, is the most important metal commodity exchange. Its quoted metal prices are most often used as a reference price in sales contracts.

The LME was established in the late 1800s at a time when commodity markets were developing into true terminal markets where trading could be done on both a spot basis and a future delivery basis. Since its inception, the LME has evolved into a broad-based metals market. After beginning to trade in copper and tin, other metals have been added including aluminum, lead, nickel, silver and zinc.

As with many institutions that have been around a long time, the LME has undergone fundamental changes to the internal workings while on surface much remains relatively unchanged. Membership is still limited to 36. Trading for each metal is by open outcry and is limited to two, five-minute sessions each morning and afternoon. The daily official reported price is the last best bid and offer for each metal of the morning session as determined by the LME Quotation Committee. The accompanying graphs show the daily LME official price fluctuations for lead, zinc and silver in 1988-89.

References on Metal Prices

1. *Marketing of Nonferrous Metals, Proceedings No.19*, November 1988; Editors, L.M. Jackson, P.R. Richardson; Centre for Resource Studies, Queen's University; Kingston, Ontario.

2. *The London Metal Exchange A commodity market*, 3rd Edition 1989, R. Gibson-Jarvie; Woodhead-Faulkner; London England.

3. *Wolff's Guide to the London Metal Exchange*; Rudolf Wolff & Co. Limited, 2nd Edition, 1980; Metal Bulletin Books Ltd. London, England.

Figure 1 Metal Prices

Table 3:
Exploration, Yukon Territory

Location (1)	Company (2)	Property/Area (3)	Mineralization (4)
1		Sixtymile	Placer Au
2		Klondike	Placer Au
3	Gold City	Indian River	Placer Au
4	United Keno Hill	Gold Bottom Creek	Au
4	United Keno Hill	Quartz Creek	Au
5	Total Energold	O'BRIEN	Au
5	Noranda	BREWERY CREEK	Au
6	Teck	Gold Run Creek	Placer Au
6	Queenstake	Blackhills Creek	Placer Au
7	Queenstake	Maisy May Creek	Placer Au
8	Secret Pass	SLEET	Au
9		Mayo	PlacerAu
10	Canada Tungsten	Swamp Creek	Placer Au
11	Archer, Cathro	NUCLEUS	Au, Cu
11	Doron	Caribou Creek	Au
11	E. Curley	GRIZZLY	Au
12	BYG Natural	Mount Nansen	Au, Ag
12	BYG Natural	TAWA	Au, Ag
12	Aurchem	GOULTER	Au, Ag, Pb
12	Noranda	DOWS	Au
13	Reed Creek Placers	Reed Creek	Au
13	All-North	WELLGREEN	Pt, Cu, Ni
14	Nathan	GLEN	Au
14	Burwash	Placer	Au
15	United Keno Hill	RUBY	Au
16	R. Stack	KINCORA	Ag, Cu, Zn
17	Harjay	ELLEN	Cu, Au
17	Harjay	COLTON	Au
18	G. Davidson	EVIEW	Ag, Pb, Cu
18	G. Davidson	PUGH PEAK	Au, F
19	Mount Skukum Gold	Mount Skukum	Au, Ag
19	Omni/Skukum Gold	Skukum Creek	Au, Ag
19	Total Energold	CHARLESTON	Au, Ag
19	Northern Minerals	EARL	Au
19	Adastral	Macauley Creek	Ag, Au, Pb, Zn
20	United Keno Hill	JOE PETTY	Au, Ag
20	United Keno Hill	Venus Mine	Au, Ag
21	Dunvegan	TOG	Au, Pb, Zn, Cu
22	L. Carlyle	Mount Byng	Au, Cu
23		Livingston Creek	Placer Au
24		MURNION	Ag, Pb, Zn
25	Oropex	MATTHEW	Au
26	Silverquest/NDU/Adrian	PORKER (HYLAND GOLD)	Au
27	Curragh/Hillsborough	HUNDERE	Zn, Pb, Ag
28		BAR	Zn, Pb, Ag
28	First Yukon	Swift River	Zn
29	Yukon Minerals	GROUNDHOG	Pb, Zn, Ag, Cu

Table 3 (continued)
Exploration, Yukon Territory

Location (1)	Company (2)	Property/Area (3)	Mineralization (4)
30	Casau	HOPKINS	Cu
31	Teck	Williams Creek	Cu
32	United Keno Hill	Minto	Cu
33	Eagle Lake	RESERVE	Cu
34	Cominco	TOM	Zn, Pb, Ag
35	Cominco	NIDD	Zn, Pb, Ag
36	NDU Resources	MARG, JANE	Cu, Pb, Zn, Ag
37	Billiton	BLENDE	Pb, Zn, Ag
38	Inco	NICK	Ni
39	J. Dodge	LADY LEE	Jade
40	M. Rosequist	KING ARCTIC	Jade
41	Barytex	MEL	Zn, Pb, Ba
b	Curragh	Vangorda Plateau	Pb, Zn, Ag
b	Curragh	DY	Pb, Zn, Ag
b	Goldnev	GREW CREEK	Au, Ag
c	Canamax	GULLY, TARN, KNOLL	Au

(1) Table location is made with reference to corresponding numbers on Yukon and Northwest Territories maps. Locations are approximate.
(2) Abbreviated name of the Company is used: Expl. (Exploration), Ltd./Ltée (Limited), JV (Joint Venture).
(3) Geographical areas are indicated by small print, whereas claims and groups are capitalized. Abbreviated words are: Peninsula (Pen), River (R), Lake (L).
(4) Metal(s) of primary importance defined by chemical symbols: copper (Cu), gold (Au), lead (Pb), tantalum (Ta), lithium (Li), asbestos (asb), molybdenum (Mo), silver (Ag), barium (Ba), cobalt (Co), tin (Sn), iron (Fe), tungsten (W), niobium (Nb), berylium (Be), rare earth elements (REE), mercury (Hg), antimony (Sb), uranium (U), flourite (F), gallium (Ga) and germanium (Gr), rhodonite (Rho).

Table 4:
Exploration, Northwest Territories

Location (1)	Company (2)	Property/Area (3)	Mineralization (4)
1	L. Anderson	Elu Inlet	Au
2	L. Anderson	Hiukitak River	Au
3	BHP-Utah	Bathurst Inlet	Au
3	Chevron	TURNER, FARN, KNUT	Au
4	Orofino	ARCADIA	Au
4	Continental Pacific	CHAR, MIST, TAM	Au
5	BHP-Utah	Anialik River	Au
5	BHP-Utah	BRAVO, CAIRO, CYGNET	Au
5	Continental Pacific	HIL, CHARLY, ALF, CHARLIE	Au
6	BHP-Utah	Hood River	Au
6	BHP-Utah	DEN, CROWN, PULSE	Au
6	BHP-Utah	ULU	Au
7	Cominco/Westview	REN	Au
7	Echo Bay	Leanne Lake	Au
8	Back River JV	Nose Lake	Au
8	Bre-X Minerals	ED, RED	Au
8	Sirius	MUSKOX	Au
8	Back River JV	SAW	Au
9	Sirius	FIRE	Au
9	Back River JV	MR, BRAU	Au
10	George Lake JV	George Lake	Au
10	George Lake JV	Boot Lake	Au
11	Noranda	MESA	Au
11	Neptune	COLOMAC	Au
11	Etruscan	AZTEC, KING, INCA	Au
12	Noranda	INDIN	Au
12	Noranda	NOR	
13	S.A. Eccott	Exeter Lake	Au
14	Noranda/Total Energold/Hemlo	TUNDRA	Au
14	Battle Mountain	MOG	Au
15	Hidden Lake	NANCY, CAM, CINDY	Au
15	Cominco	RUBY	Au
16	Freeport-McMoran	LONGSPUR	Au
16	Noranda	Allan Lake	Au
16	Pamorex	AP, RED	Au
16	Cameron	Burnt Island	Au
17	Highwood/Hecla	Thor Lake	Be, REE
17	Mt. Grant Mines	Bullmoose Lake	Au
17	Hidden Lake	RUTH	Au
18	Echo Bay	SP	Au
18	Pacific Northwest	RUST, ISL, TIP, APEX	Au
18	Fortune Minerals	YELLER	Au
19	Hidden Lake	GERM	Au
20	BBX Resources	Taltheilei Narrows	Au
21	Kelmet	Lac Duhamel	Au
22	Leeward Capital	Meridian Lake	Au
23	B. Weir	MING	Au, U
24	Athabaska	ESK, ENN	Au, Pb, Zn
24	Courageous Exploration	Atzinging Lake	Au

Table 4 (continued)
Exploration, Northwest Territories

Location (1)	Company (2)	Property/Area (3)	Mineralization (4)
25	Courageous Exploration	Snowbird Lake	Au
25	Agnico Eagle	Rochon Lake	Au
26	Noranda	DEB, DEM, JEN	Au
27	Dejour/Noble Peak	Turquetil Lake	Au
28	BHP-Utah	Kaminak Lake	Au
29	Sikaman	Kaminak Lake	Au
29	Noble Peak	Quartzite Lake	Au
30	Sikaman	Maze Lake	Au
30	Inco Gold	IGLOO	Au
31	Comaplex	Tehek Lake	Au
32	Comaplex	THOM	Au
33	Liard River Expl.	Liard River	Placer Au
34	Sirius/Verdstone	Selena Creek	Placer Au
34	M.R. Vulimiri	CHUCK	Au
35	Procan	AX, DOG, MITERK	Pb, Zn, Ag
36	Falconbridge	HOOD	Zn, Cu, Ag
37	Aber	Victory Lake	Zn, Pb, Ag, Au
37	Strathcona	Tumpline Lake	Zn, Pb, Ag, Au
37	Hidden Lake	JE	Zn, Pb, Ag
37	Noranda	Sunset South	Zn, Pb, Ag, Au
37	Noranda	SHEET	Zn, Pb, Ag, Au
37	Noranda	Sunrise	Zn, Pb, Ag, Au
37	Continental Pacific	LARK	Zn, Cu
38	Ego/Asquith	BB Lake	Zn, Pb, Ag
39	BHP-Utah	Rutledge Lake	Ni, Cu, Pt
40	Fortune	Salkeld Lake	Cu, Pb, Zn, Au
41	Solid Resources	Thye Lake	Ni, Cu
42	Borealis	Nagvaak Lake	Pb, Zn
43	Nanisivik	Mary River	Pb, Zn
44	Cominco	Cornwallis Island	Pb, Zn
45	Urangesellschaft	Kiggavik	U
45	PNC Expl./BP Resources	Schultz Lake	U
46	Urangesellschaft	Judge Sissons Lake	U
46	CEGB Exploration	BIFF	U
47	PNC Expl./CEGB Expl.	West Schultz	U
48	CEGB Exploration	BUD	Au
49	CEGB Exploration	BULLY, BULLWINKLE	U, Ag, Cu
50	J. Price	REO	U
50	C. Williams	O'Connor Lake	Pb, Zn
51	Corona	North Arm, Great Slave L.	Diamonds
52	BP Minerals	Horn Plateau	Diamonds
53	International Platinum	OX	Pt
a	Nerco Con	NEGUS	Au
a	Golden Marlin	HOPE, MARLIN	Au
a	Giant Yellowknife	GIANT MINE	Au
a	Treminco	CRESTAURUM	Au
a	Hecla	KA, PAN	Au
a	Nathan Minerals	ANN, PRO	Au
a	Can-Mac	MON	Au

Table 4 (continued)
Exploration, Northwest Territories

Location (1)	Company (2)	Property/Area (3)	Mineralization (4)
a	Kamsal	KAM	Au
a	Athabaska/Chevron	Nicholas Lake	Au
a	Kelmet	Walsh Lake	Au
a	D. Webb	NEL	Au
a	Noranda	Sito Lake	Au
a	Kelmet	CJ, JAK, CADEN	Au
a	Aber/Continental Pacific	VAD	Au
a	Canamax	VIKING	Au
b	Cominco	Truro Island	Pb, Zn
d	BHP-Utah	BRAD	Au
d	Contwoyto Goldfields	IF	Au
d	Cominco	PRO	Au
d	Cominco/Cogema	COCO, JON	Au
d	Hecla	JOHN, SHIN, DLER	Au

(1) Table location is made with reference to corresponding numbers on Yukon and Northwest Territories maps. Locations are approximate.
(2) Abbreviated name of the Company is used: Expl. (Exploration), Ltd./Ltée (Limited), JV (Joint Venutre).
(3) Geographical areas are indicated by small print, whereas claims and groups are capitalized. Abbreviated words are: Peninsula (Pen), River (R), Lake (L).
(4) Metal(s) of primary importance defined by chemical symbols: copper (Cu), gold (Au), lead (Pb), tantalum (Ta), lithium (Li), asbestos (Asb), molybdenum (Mo), silver (Ag), barium (Ba), cobalt (Co), tin (Sn), iron (Fe), tungsten (W), niobium (Nb), berylium (Be), rare earth elements (REE), mercury (Hg), antimony (Sb), uranium (U), flourite (F), gallium (Ga) and germanium (Gr), rhodonite (Rho).

Table 5:
Mineral Production — Yukon Territory
1980–1989

Mineral		1980	1981	1982	1983	1984	1985	1986	1987	1988(R)	1989(P)
Gold	$	63 029 090	66 382 000	39 721 000	50 337 000	44 419 000	42 669 000	58 237 000	88 970 000	87 386 000	80 504 000
	kg	2 982	3 746	2 656	3 006	2 960	3 065	3 547	4 674	5 052	5 551
Silver	$	114 120 000	32 339 000	29 943 000	6 891 000	18 825 000	13 098 000	18 468 000	40 965 000	42 593 000	13 384 000
	kg	147 000	80 000	95 000	15 000	54 000	47 000	73 000	133 000	159 000	64 000
Lead	$	71 558 000	54 935 000	25 733 000	307 000	1 539 000	848 000	23 893 000	105 982 000	118 696 000	X
	kg	65 771 000	55 970 000	35 493 000	520 000	2 083 000	1 470 000	35 091 000	100 267 000	117 058 000	X
Copper	$	27 082 000	20 123 000	14 654 000	3 977 000		19 000	13 000	22 000	X	X
	kg	10 433 000	9 094 000	7 510 000	1 904 000		10 000	6 000	9 000	X	X
Zinc	$	88 313 000	94 237 000	58 519 000	31 000	244 000	137 000	61 521 000	187 336 000	237 932 000	341 649 000
	kg	90 938 000	78 806 000	54 537 000	27 000	173 000	109 000	50 634 000	147 045 000	143 939 000	158 024 000
Antimony	$									X	35 000
	kg									X	14 000
Bismuth	$					2 000	11 000	5 000	2 000	2 000	3 000
	kg					162	1 000	541			
Cadmium	$				6 000	9 000	5 000	8 000	13 000	62 000	93 000
	kg				2 000	2 000	1 000	2 000	2 000	3 000	6 000
Sand and Gravel	$			550 000	1 438 000	5 105 000	2 995 000	13 355 000	1 502 000	5 184 000	5 422 000
	t			463 000	480 000	3 074 000	1 185 000	4 902 000	352 000	2 246 000	2 252 000
Sulphur	$						267 000	1 000	156 000	183 000	
(smelter gas)	t						2 000	7	1 000	2 000	
Coal (E)	$	287 000	368 000					209 000	440 000	100 000	420 000
	t	16 529	20 860					17 223	20 000	10 000	40 000
Stone	$								679 000		
	t								206 000		
TOTAL	$	364 389 000	268 016 000	169 120 000	62 987 000	70 143 000	60 069 000	176 310 000	426 027 000	492 299 000	540 300 000

Source: Mineral Policy Sector, Energy, Mines and Resources Canada and Natural Resources and Economic Development, Indian Affairs and Northern Development.
(P) Preliminary figures, (R) Revised figures, (E) Estimated, (X) Confidential

Table 6:
Mineral Production, Northwest Territories
1980-1989

Mineral		1980	1981	1982	1983	1984	1985	1986	1987	1988(R)	1989(P)
Gold	$	96 920 000	85 495 000	91 415 000	144 570 000	191 071 000	177 079 000	205 266 000	223 456 000	205 503 000	174 770 000
	kg	4 209	4 825	6 113	8 634	12 732	12 713	12 503	11 740	11 880	12 051
Silver	$	41 331 000	13 456 000	16 073 000	33 743 000	20 361 000	9 083 000	5 478 000	4 006 000	6 923 000	4 250 000
	kg	53 000	33 000	51 000	74 000	59 000	33 000	22 000	13 000	26 000	20 000
Copper	$	679 000	613 000	419 000	214 000	130 000	46 000	1 000	4 000	3 000	3 000
	kg	262 000	277 000	215 000	102 000	69 000	23 000	1 000	2 000	1 000	1 000
Lead	$	55 853 000	44 680 000	46 367 000	47 981 000	66 647 000	44 489 000	91 129 000	139 370 000	52 223 000	38 998 000
	kg	51 337 000	45 522 000	63 955 000	81 161 000	90 198 000	77 083 000	133 836 000	131 744 000	51 502 000	37 426 000
Zinc	$	172 556 000	159 764 000	229 110 000	269 951 000	386 813 000	356 415 000	322 064 000	328 781 000	537 756 000	728 401 000
	kg	175 685 000	133 604 000	213 523 000	234 883 000	274 920 000	284 223 000	265 073 000	258 070 000	325 321 000	336 911 000
Cadmium	$				10 000	1 034 000	866 000	670 000	501 000	3 172 000	4 410 000
	kg				3 000	214 000	238 000	175 000	86 000	166 000	269 000
Bismuth	$				163 000	34 000	60 000				
	kg				32 000	3 000	3 000				
Antimony	$								141 000	55 000	25 000
	kg								44 000	19 000	10 000
Tungsten Trioxide (E)	$	67 646 000	43 363 000	38 353 000	11 221 000	33 584 000	38 918 000	17 363 000			
	kg	4 007 000	2 515 000	2 925 000	1 126 000	3 112 000	3 529 000	2 470 000			
Arsenious Trioxide (E)	$		561 000	3 862 000	2 345 000	5 837 000	1 969 000	254 000	666 000	2 366 000	1 248 000
	t		1 094	1 780	982	4 684	4 098	406	X	X	X
Sulphur (smelter gas)	$						11 665 000	21 788 000	6 912 000	7 286 000	2 069 000
	t					98 000	147 000	59 000	6 000	73 000	21 000
Sand and Gravel	$			41 482 000	32 479 000	36 323 000	8 981 000	3 281 000	8 132 000	10 966 000	10 841 000
	t			6 625 000	5 905 000	7 249 000	6 803 000	986 000	2 183 000	2 443 000	2 182 000
Stone	$			1 268 000	14 601 000	4 617 000	434 000	1 011 000	1 486 000	232 000	622 000
	t			323 000	2 409 000	729 000	163 000	368 000	472 000	108 000	172 000
TOTAL	$	434 985 000	347 841 000	468 349 000	557 198 000	746 451 000	649 732 000	668 452 000	713 310 000	826 487 000	965 638 000

Source: Mineral Policy Sector, Energy, Mines and Resources Canada and Natural Resources and Economic Development, Indian Affairs and Northern Development.
(P) Preliminary figures, (R) Revised figures, (E) Estimated, (X) Confidential